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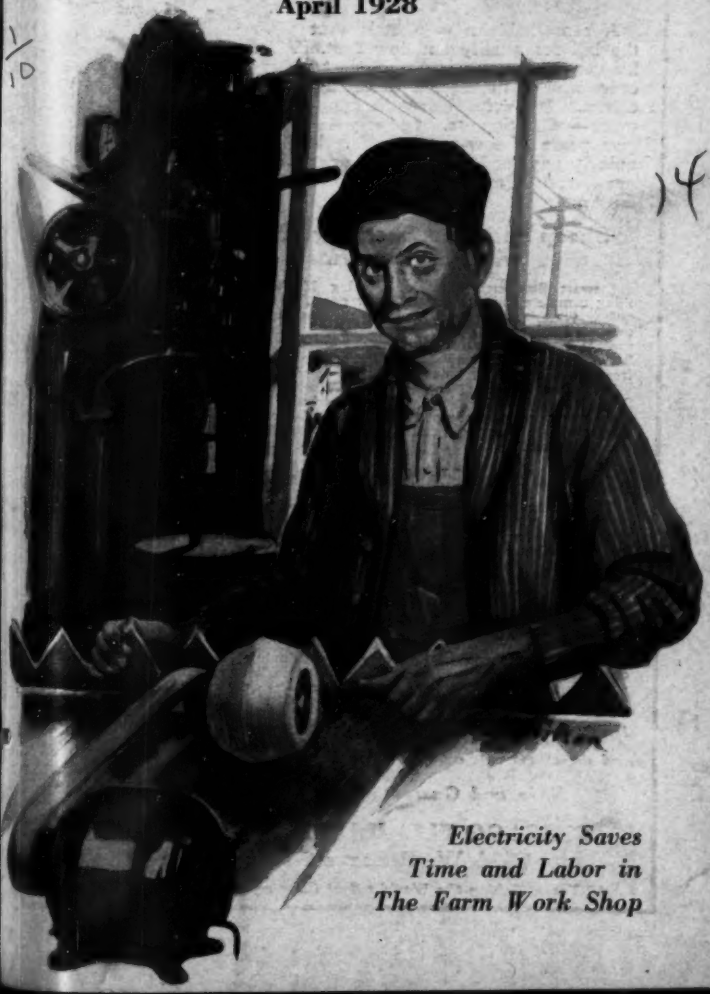
Electricity on the Farm

April 1928



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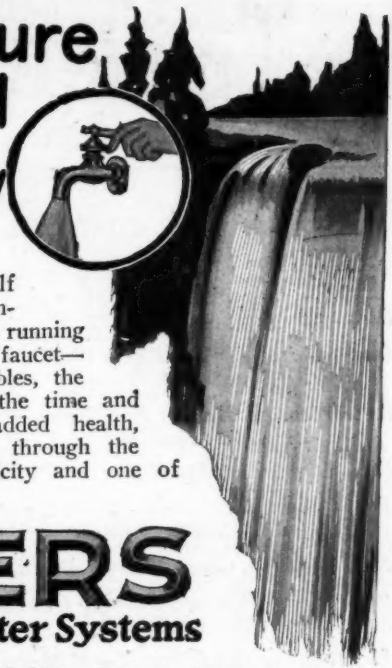

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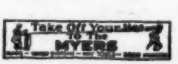
For a demonstration see your dealer, or 

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Electricity on the Farm

Vol. 1 APRIL 1928 No. 9

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Faucets Everywhere
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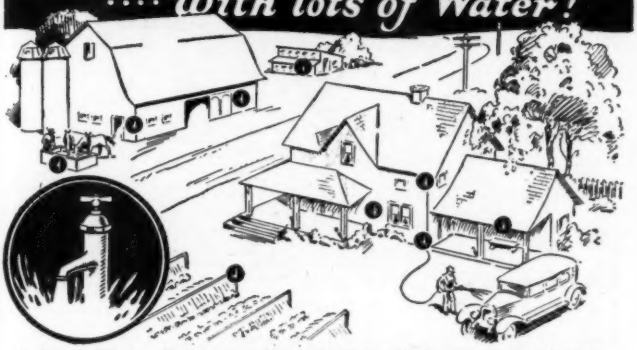

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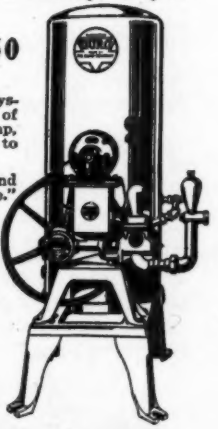

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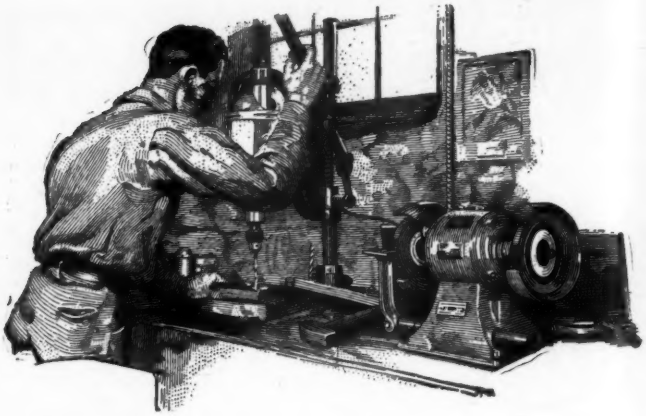


When Time Means Money

THE standing wheat dead ripe; dry hay in the field, and a storm predicted; the truck loaded for a quick run to market—it is at times like these that broken equipment can prove very costly.

In such crises how satisfying it is to know that a little G-E motor is waiting in your machine shop, ready to turn a grindstone, a lathe, or a drill press to make an emergency repair.

This is but one of many ways in which G-E motors, and other electric equipment, are adding daily to the efficiency and comfort of farm life. The farmer who knows electricity looks for the G-E monogram before he buys.

Ask Your Power Company

If your farm is on or near an electric power line, ask the power company for a copy of the new G-E Farm Book which explains more than 100 uses for electricity on the farm.

GENERAL ELECTRIC

Electricity on the Farm

Vol. 1 APRIL 1928 No. 10

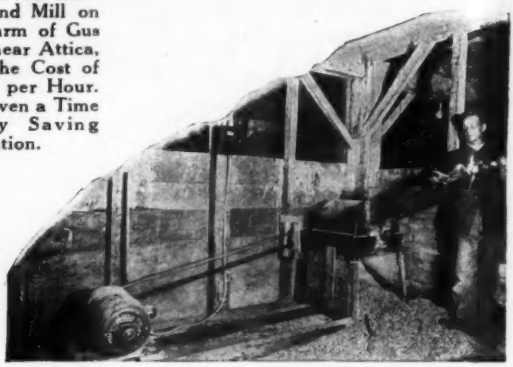
Repair Work at Night The work shop is probably the most useful of the smaller farm units. When it is needed it is usually needed in a hurry, and if properly equipped it will pay for itself many times over by eliminating delays which would otherwise result by having repair work done in neighboring towns or cities.

But where electric service is available, and is employed, the farm workshop looms as the most popular point on the farm, as well as the most useful.

For example, it is a mighty simple task to run a mowing machine up to the door, remove the sickle, and sharpen it on a motor driven sickle grinder under the efficient light of an electric bulb, and have the machine all assembled and ready for work again in very short order. Maybe you don't think the electrically equipped repair shop is popular among the youngsters on the farm! Well, just ask the average farm boy who has one to work in.

Progress in Dairying Fifty years ago Dr. Gustaf De Laval invented the first cream separator. This invention revolutionized the dairy business. During the fifty years since Dr. De Laval's invention was placed on the market, dairying has advanced from an undeveloped, unscientific and relatively unimportant industry into the largest and most vital industry in the world.

An equally remarkable development is taking place right now in our own time and which will prove of even greater magnitude. This is the electrification of dairy processes. It is not stretching the imagination very far to picture the dairy industry of twenty years hence as one entirely electrified, including the sterilization of milk. Even dairy cows may then be treated electrically to improve the quality of the milk. Who can tell?



Grinding Feed with Electric Motor and Mill on the Dairy Farm of Gus L. Swanson, near Attica, Indiana, at the Cost of a Few Cents per Hour. This Has Proven a Time and Money Saving Operation.

Don't Grind The Feed Too Fine!

Power May be Wasted Without Increasing Food Value

By TRUMAN E. HIENTON

MOTHER Nature has provided a large number of her progeny with teeth, tusks or other masticatory equipment to assist in the preparation of food for digestion. Man has learned that in a great many cases it is possible for him to supplement the equipment provided by Mother Nature to assist in preparing feeds for his domestic animals so that they can more completely digest them. Grinding is one of the very important processes by which man accomplishes this purpose.

It has been generally conceded for a number of years that it was a profitable proposition to grind feed for dairy cattle. The degree of fineness to which this feed should be ground was purely a matter of opinion which depended upon the farmer or the man doing the grinding. It remained for the Dairy Department of Purdue University Agricultural Experiment Station to definitely establish that grinding grain for dairy cattle was profitable and to determine the proper fineness for grinding.

The report of this work was released recently in a mimeographed circular. Twenty cows

were divided into four lots of five each and fed over an actual experimental period of 84 days. These lots were fed whole corn and oats, cracked corn and crushed oats, medium ground corn and medium ground oats and pulverized corn and pulverized oats with the addition of wheat bran and linseed meal as the grain ration. Each lot of cows received each fineness of grain for a period of three weeks, following which a one week period was allowed for changing to another fineness.

Figures on Ground Food

The costs of grinding were secured on one mill only by the Agricultural Engineering Department and these figures were used in computing the grinding cost. The figures on the following page show the results reported by Professor Wilbur.

These figures show conclusively that the grinding of grain for dairy cows is profitable but that it should not be ground too fine because of the extra cost of grinding.

The small hammer mills which can be driven by a 5 h.p. motor or less will provide an answer to the dairyman's grinding problems. Investigational work carried on by the Agricultural Engineering Department of the Purdue Agricultural Experiment Station indicate that the power cost for grinding is usually ⅓ to ½ that of the charge for custom grinding. The arrange-

Interior of Electrically Equipped Corn Crib. Granary and Elevator on the Farm of Ed. Layden, near Odell, Ind. All he has to do is Turn on the Electric Switch and the Corn is Elevated by Belt from the Crib Into the Hopper Where it is Shelled, then Elevated into the Grinder and from There into the Bin Ready for Feeding. There is no Hand Work Connected with the Operation.

	Whole grain	Cracked or crushed grain	Medium ground grain	Pulverized finely ground grain
Milk production	8,975.1 lb	9,324.1 lb	10,114.3 lb	9,564.3 lb
Returns, at $2 Cwt.	$179.50	$190.48	$202.29	$191.29
Feed cost	$125.27	$124.47	$123.87	$124.31
Grinding cost	.....	$0.98	$1.36	$13.48
Total cost feed and grinding	$125.27	$125.45	$125.23	$137.79
Returns above cost	$54.23	$65.03	$77.06	$53.50
Cost per 100 pounds milk	$1.39	$1.32	$1.24	$1.44
Average gains in weight (21 days)	10 lb	23 lb	22 lb	19 lb

ment of the grinder in one of the accompanying illustrations show a convenient method for grinding. Shelled corn and oats are placed in the box over the grinder, then pass through the mill and drop into the feed box on the floor below. This effects not only a considerable saving in handling the grain but reduces the time required to a minimum. Some satisfactory method should be devised for confining the grain dust thus formed as it may be explosive under certain conditions.

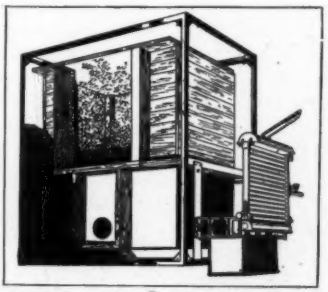
Convenient Method for Grinding. Shelled Corn or Oats are Placed in the Box Over the Grinder, Then Pass Through the Mill and Drop Into the Feed Box on the Floor Below.

Refrigeration Brings New Dairy Profits

By E. R. MEACHAM

SINCE quality has assumed such prominence in milk furnished by farmers to milk distributors, anything which improves milk quality also results in a higher price paid for that commodity. In the article below, Mr. Meacham very ably outlines the benefits of electrical refrigeration to the milk producer.

The day when a bottle of milk was a bottle of milk has definitely passed. Milk distributors are beginning to offer the farmer who sells fluid milk a chance to profit by cleanliness of equipment and method. They are making quality pay.



Skeleton View Showing Construction of the Dry Type Milk Cooler.

I am not talking of certified milk; that is a business by itself. The ordinary farmer, even with the best intentions in the world, and high ideals of dairy practice cannot meet the requirements set up for certified milk. I am talking of the developing market for milk of medium grade; milk produced not in ideal dairy plants, but on the regular dairy farm; milk with a richness of 3.5% taken for granted, but whose distinguishing mark is the low bacteria count that measures cleanliness.

A distribution plant at Lake Geneva, Wisconsin, collects milk from the excellent dairy herds in the country round about. It pays a base price for milk of standard richness, and a bonus of 40c a hundred pounds for all milk showing a bacteria count of less than 10,000 to a cubic centimeter, and 25c a hundred pounds where the count is between 10,000 and 25,000. The milk is marked grade A and sold in the Chicago market.

No one bringing milk to this plant can lapse into careless practices for long. If he fails to get this bonus for a certain time, he is dropped, and his place is filled from the long waiting list of farmers who are eager to supply this profitable market. So he must keep a herd of healthy cows; he must produce the milk in clean barns, and catch it in clean utensils.

But even milk with a history like that does harbor some bac-

teria and the only way the farmer can control their rapid multiplication is by lowering the temperature of the milk.

That makes refrigeration the crux of this whole business.

Many of these Lake Geneva farmers cool their milk with ice. They haul it out from town for their big cooling tanks, or they cut it in winter and store it in ice houses. But several of them have adopted automatic, trouble proof electric refrigeration to do the job.

Built of Concrete

The cooler found on most of these farms is a concrete tank of water kept as cold as ice by the refrigerating coils that extend around the inside of the tank. The milk comes in from the barn in tightly closed cans which are set directly into this tank and held there until delivery. These tanks will lower the temperature of the milk to 50° within an hour and twenty minutes after it is set in.

The tanks were all built by the farmers themselves, or by local help, from plans supplied by the company installing the refrigerating unit.

An Easy Job

Robert Behrens built his nine can tank in a few hours. It has the usual 3" cork insulation in the sides and bottom, and the concrete lining. The outside of the tank was made of boards overlaid with zinc.

"There were three of us working at this tank," said Mr. Behrens, "and it took us just half a day to make it. Of course we knew just what we were going to do, and we did not waste any time doing it. We worked while we were at it, I can tell you. But we kept the cost down. All of the materials and all of the labor came to only $49.00."

Builds Dairy House

Mr. Aspinwall built a new dairy house to hold his cooling tank. There was one corner of his barn that had always been waste space. He made this over into an excellent dairy room by careful insulation. It opens outside rather than into the barn, so its location is not contrary to dairy regulations.

The walls of this new house are about 7 in. thick. On the outside of the studding there is a layer of building paper covered with 1 in. sheathing, then another layer of building paper and an outer wall of good shiplap. The inside is finished with a third layer of building paper covered with 1 in. matched lumber. Even the windows are double,—and the tight fitting door is 3 in. thick. This makes the room quite cool in Summer and so warm in Winter that the water in the tank never freezes over.

Not Expensive

His tank is built for 15 cans. It is 4 ft. 6 in. by 7 ft. 6 in. There is the regulation 3 in. layer of cork in the sides and bottom. This was tarred on both sides to keep moisture out, and about 3 in. of concrete were applied inside and out. The cost of building the house and tank was about $300.00.

"It used to cost us at least $100.00 a season for ice," Mr. Aspinwall said. "That doesn't count the extra work either, and we always seemed to be out of

(*Continued on page 29*)

On Western Dairy Farms One of the Proven Time-Savers Is The

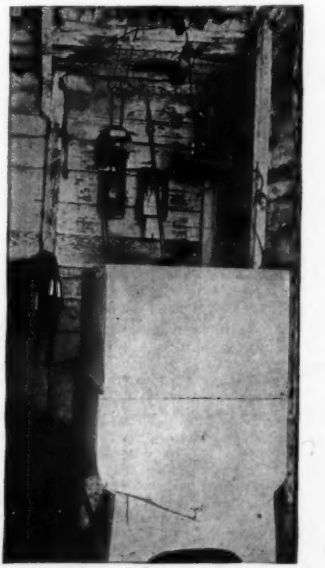
Electrical Dairy Sterilizer

By T. A. WOOD

A LOW bacteria count in milk earns a higher grading for the milk. Experience has shown that one of the chief causes for high bacteria count is improperly sterilized dairy equipment; hence properly sterilizing utensils is not only a good practice around dairy farms, but is one which pays big dividends. In the following article Mr. Wood tells of the performance of electric sterilizes.

Sterilization of the utensils used in the handling of market milk is usually accomplished by rinsing the equipment in a cleansing solution and then sterilizing them in boiling water, live steam or hot air. The method generally used has been to sterilize with live steam and most of the recent sterilizer developments have been along that line. The heat required to generate the steam is obtained by the combustion of fuels or by electrical means.

During the period from 1925 to 1928 the number of electrically heated dairy equipment sterilizers in use in the West has shown a remarkable growth. This growth can be attributed in part at least to the fact that the temperature within these units can be automatically controlled and because they are fumeless, sootless, sanitary and convenient. Their first and operating costs have proven to be such as to render their use profitable to the average and small size dairyman on the western slope.



One of the successful types of electric dairy equipment sterilizers in common use in California. The lid is closed in this picture shutting off a view of the equipment being sterilized.

While their use so far has been pretty well confined to the regions west of the Rockies there appears to be no valid reason why they cannot be successfully introduced east of the mountains as well, providing, of course, that the fundamental requirements of a successful electric dairy equipment sterilizer are not forgotten. These requirements are as follows:

Requirements

1. The sterilizer should be made of a material that will not deteriorate rapidly. It should be simple and sturdy.

2. It should be designed to hold only enough water to safely cover the electric heating element. (From ten to seventeen pounds of water for a 4 ten gallon can sized).

3. The surfaces of the tank must be well heat-insulated with some insulating material which will not be damaged by water. An air jacket around the entire tank has proven to be a very efficient heat insulator. A better insulator may be required in colder sections of the country.

4. The electric heating element should be of three or five kilo watt capacity (five kw. size preferred) and should be an immersion type. The five kw. unit was found to sterilize in less than half the time required by the three kw. unit and with a smaller consumption of energy per sterilization.

5. An automatic thermostat switch should be employed to interrupt the electric current when the desired temperature has been reached.

6. The first and operating costs should be such as to render its use profitable to the dairymen. In the 4 ten gallon size the energy consumed need not exceed 3 kwh. per sterilization if excess water is not used and if good insulation is employed.

Legal Quality

Many cities have passed exacting laws governing the quality of the milk offered for sale within their boundaries. The quality of the milk is determined in part at least by a milk bacteria count. As an illustration of one of these laws, The Dairy Law of California states that milk having a bacteria count of one hundred thousand or less shall be classed as Grade A milk while all over that figure shall be classed as a second grade product. A premium of two or more cents is paid per gallon on the Grade A milk. This premium more than pays for the added cost to produce it.

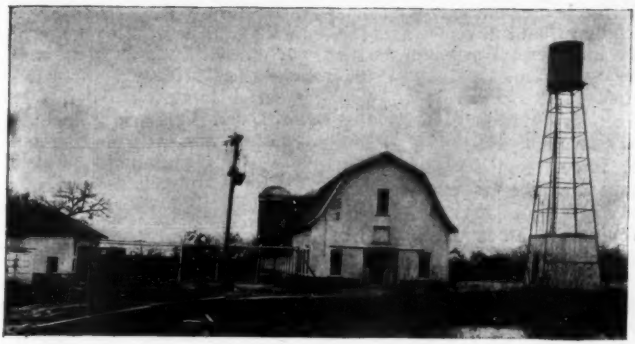
Utensils Must Be Clean

The Dairy Law quoted above further states that all utensils (cans, buckets, bottles, etc.) used in conveying market milk from the dairy to the consumer shall be sterilized at a temperature of not less than 170°F for a period of fifteen minutes. Proper sterilization of these utensils, it has been found, greatly reduces the possibility of a high bacteria count. Milk having a low count usually keeps for a longer period. The law, however, is silent as to what the nature of the sterilizing equipment shall be.

Increasing in Use

Sterilizers were not in common use before the passage of this law. After its passage some means had to be found by which sterilization could be accomplished. The large dairies which were already using steam boilers made provisions to use live steam, while those who had no boilers were forced to install them at once or make other provisions to accomplish the same result. One of the earliest

(*Continued on page 29*)



Farm Electric Service
What Does it Cost?

By J. E. WAGGONER
Agricultural Engineering Dept.
A. & M. College of Texas

PROGRESS in a new field is nearly always slow. It is necessary and well that it should be because there are usually many problems that have to be solved. A study of the present status of the use of electricity on Texas farms shows that we not only have the usual problems but to me many very unusual ones to overcome. I dare say that a large percentage of the obstacles to be met here are found in other states and it occurred to me that for this reason the readers of ELECTRICITY ON THE FARM might be interested in this subject.

J. E. Waggoner

What Does It Cost?

The first question that confronts us and no doubt others, the same way, is "What does it cost?" The item of cost of serving farms from central power stations has two branches, both of which are equally important and must have equal consideration, namely, cost to the farmer and cost to the power company.

How Cost Is Made Up

The cost to the farmer includes the purchase of farm electrical equipment, the wiring

of the house, the barn and outbuildings, and in some cases the advance of part payment on the necessary additional line extension. The survey of Texas electrified farms showed that 147 farmers advanced $207 each on line costs; that wiring buildings cost them $100.44 on the average and that the electric equipment amounted to $970, making a total of $1,277.44.

The return on this investment and the monthly bills must be measured in greater comforts and conveniences to the whole family, saving of time and labor, increasing the farm income and increase in value of the farm. Nearly all of the Texas farmers interviewed said that electric service from central power stations had increased the value of their farms. The average of their estimates, based on comparison with neighboring farms, was 12.7%. Coming as it has from so large a number, I believe that figure is reasonably accurate and will apply generally. To all this must be added the almost priceless satisfaction of having the modern improvements which add much to the attractiveness of a country home.

The Sentinel of the Electrified Farm; and a Sure Sign of Progressiveness.

Must Pay the Company

The rural extension must be profitable to the power company, that is, the monthly revenue should be a reasonable return on the investment if the extension is to be permanent and if expansion is to take place. In behalf of safety a rural line must be built to certain high standards of construction and the maintenance must keep it to that standard in order to make the transmission of electrical energy reasonably safe to all farm life. In no case should the rural telephone line be taken as a standard of construction. They are often seen in a very dilapidated condition which doesn't seriously affect any one except those trying to use the telephone. A rural electric line would be very dangerous if not more substantially built and better maintained than rural telephone lines.

Delivery Cost

Although electrical energy is invisible it must be considered as a commodity contributing to the welfare of the home. Like other commodities—food, clothing, shelter—there is the cost of production or of generating and transmitting, heavy investments

"I would like to see the time come when the toilsome tasks of the farm home and the farm chores can be turned over to electricity. Then the country homes will be as comfortable and as attractive as those in the city."

in power plants and equipment, costs of maintaining service, depreciation and meter reading, all of which must be taken into consideration in figuring the cost of delivering electric service to the farm.

Rural lines cost from $1,000 to $2,000 a mile, depending on conditions. The contour of the country, the soil, amount and kind of growth affect the cost of constructing the line. The number and location of customers affects the size and spacing of transformers. All of these, together with interest, taxes, insurance and depreciation must be taken care of in the return on the investment. Transformers consume a small amount of current constantly whether the customer is using the current or not. There are also transmission line losses. The reading of meters, correcting trouble and generally maintaining the line must all be taken into consideration in figuring the cost of supplying electrical energy to the farm.

Another Big Item

In transmitting electrical energy over long distances from the power plant where it is generated, it is necessary to use high voltages to obtain economical and efficient transmission. The high voltage current is transformed or stepped down at central points where consumption is greatest and is transmitted from there to outlying districts at voltages best suited for the distance transmitted. The cost of a transformer substation is very high, depending of course on voltages and capacities, but it runs from $18,000 to $30,000 and often more. Transformer sub-station investment must also be taken into consideration in figuring costs of service to the farm.

Rural electrification is still in its infancy; much work remains

On Southern Farms Electricity Is Emancipating the Colored Help From Hard Work.

to be done to determine the true economics of the undertaking. The cost of line extension to the farm, on the average, is so great that the lighting and small socket equipment load is not sufficient to make such extension possible except in special instances. Larger farm loads are necessary. The average monthly consumption of electricity on 63% of the electrified farms surveyed was only 18.44 kwh. If this represents the economic maximum consumption, then there is little hope for general rural electrification.

Load Must Pay

On the other hand, this survey shows that 40 farms of the same type had a monthly consumption of 194 kwh. Should this or a higher figure be found to be the economic monthly consumption of the average farm, then there will be brighter prospects for rural extensions because it makes possible a reasonable return to the power companies and therefore becomes a desirable load.

Progress and Prosperity

I would like to see the time come when the toilsome tasks of the farm home and the farm chores can be turned over to the feelingless prime mover—electricity. Then the country homes will be as comfortable and as attractive as those in the cities. This will make for contentment, progress and prosperity in the most fundamental of all human occupations—that of farming. Observation indicates that electricity is capable of doing more than any other kind of power to make rural life happy and prosperous.

New Bulletin Gives Many Farm Uses for Electricity

Investigation and experiments that have been conducted in twenty-four States during the last four years on the problems of farm electrification, are reported in a recently issued Bulletin of the National Committee on the Relation of Electricity to Agriculture. This report summarizes the results of efforts that have been made to determine in what ways electricity may assist the farmer in more efficient methods and improve living standards of the rural home.

This comprehensive report, "Electricity on the Farm and in Rural Communities," is a 136 page bulletin containing 210 illustrations and 83 tables and gives general information as well as technical data on more than 100 uses for electricity that have been tried and found economically advantageous for the farm and farm home. While some of the apparatus described is only suitable for certain sections of the country most of the electrical devices are adaptable to the average farm. The photographs are all of actual installations and most of the tables show the operating efficiency and current consumption of the electrical helps that have been developed to secure to the American farmers the benefits of electricity.

The Committee on the Relation of Electricity to Agriculture is a co-operative organization organized in 1923 to give purpose and direction to a national movement looking toward the solution of the problem of getting electric light and power service to the farms of the United States. The present membership of the committee includes representatives of the following: American Farm Bureau Federation, American Home Economics Assocation, American Society of Agricultural Engineers, General Federation of Women's Clubs, Individual Plant Manufacturers, National Association of Farm Equipment Manufacturers, National Electric Light Association, National Grange, National Electrical Manufacturers' Association, U. S. Department of Agriculture, U. S. Department of Commerce and the U. S. Department of Interior.

This Committee conducted its investigations through State organizations and Universities.

After using electricity around the farm since they first started farming, the Frickes, of Virginia, say:

Mrs. and Mr. C. W. Fricke

"We'd Hardly Know How to Get Along Without It"

By CHAS. E. SEITZ

MR. C. W. FRICKE, a poultry farmer of Albemarle County, Virginia, is a firm believer in electricity on the farm. Mr. Fricke is using electric power to cut down his labor and production costs as well as an aid to better living on the farm. Unlike most farmers, Mr. Fricke secured electric service as the first step in starting his farming enterprise, and used this electric power for pumping water to the site of his new home for use in mixing the concrete. The electric current was also used for operating the concrete mixer and driving the saws for cutting and sizing the inside framing material for the house.

Mr. Fricke has had considerable experience with electricity and he has used his electrical knowledge, together with good common sense, to rig up a number of electrical appliances for use in his poultry plant and in his home. Electricity is used in his home to cook, heat water, light and heat his house and run the numerous common electrical appliances, such as washing machine, vacuum cleaner, percolator, etc. Electricity is being used in the poultry house to grind and mix feed, heat the brooder and incubator and heat

the water in the drinking pans. Other electrical conveniences used are, electric feed cutters in the cow stable, battery charger in the garage, welding and soldering apparatus, a 12 in. saw in the shop and a home made churn. Mr. Fricke is making his living on the farm and does not have any other source of revenue. He adds additional appliances as finances permit and hopes to eventually have an electric refrigerator, electric hot beds, overhead irrigation system and radio, etc.

Mixing Poultry Feed

His poultry feed is mixed on the farm and by using only the highest grade ingredients obtainable in mixing the feed, Mr. Fricke saves about 25% in cost over using feed already prepared. When using the corn and other grain grown on the farm the saving is still greater. Excellent results have been secured on this farm with the home mixtures. A 50% to 60% egg production is secured all winter, with birds only one-third pullets. Mr. Fricke says: "We aim to grind and crack the corn we raise on our farm to save hauling it several miles to the mill. We will have several hundred bushels of fine yellow corn this year to prepare for feeding. We find the pure yellow meal we grind superior to most of the 'Corn Feed Meals' on the market, and we like our cracked corn better. We would hardly know how to dispose of our corn, wheat, oats, sunflower seed, sour milk, etc., to advantage if we did not mix our own feeds."

The corn sheller has a capacity of from 10 to 20 bushels per hour. The grist mill grinds from 5 to 10 bushels of meal or 10 to 20 bushels of cracked corn per hour. A one horse motor

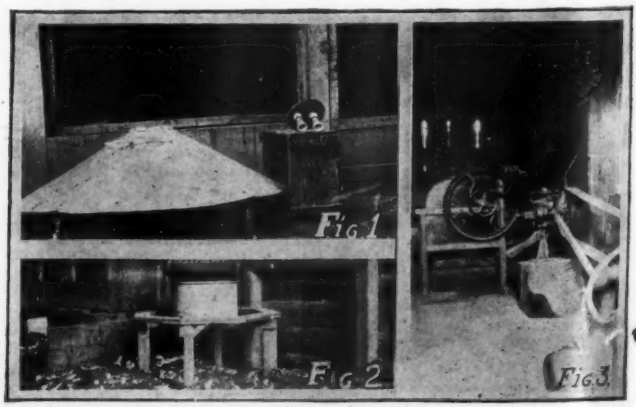


Fig. 1. Fifty-two Inch Galvanized Chick Hover With Oil Burner Removed, and Equipped with Simple Electric Heating Elements Shown on Box to Right. Fig. 2. Frost-proof Drinking Pans Used in Poultry Houses. The Sanitary Enameled Pans Are Easily Removed, Cleaned and Filled. Fig. 3. Corn Sheller and Grist Mill Operated by 1 h. p. Motor.

being sufficient to drive these machines as well as the home made feed mixer. This mixer cost approximately $17.50 for labor and materials. From six to eight hundred pounds of mash or scratch feed can be mixed at a time and dumped direct into the bins underneath.

Frost Proof Pans

Frost proof drinking pans, built by Mr. Fricke, are used in the poultry house to keep the water warm in winter. The drinking pan consists of a simple enameled pan resting in a 28 gauge galvanized iron pan with porcelain receptacle and 25 watt carbon bulb attached. These frost proof pans have proven effective in the coldest weather.

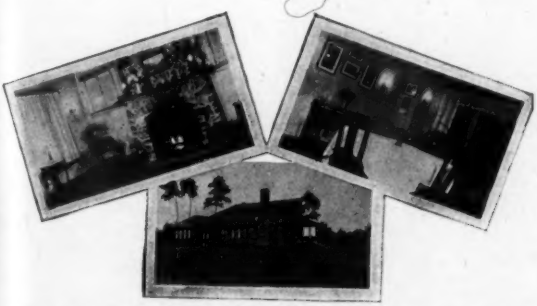
The hot water incubators formerly oil heated, have been equipped with home-made electric heating elements.

While this heating element has proven entirely satisfactory, simple elements to be placed inside the incubator, with thermostat control, can be purchased at reasonable prices already assembled. Such elements would consume considerable less current than the home-made element. In this particular case this element was made with materials on hand to save purchasing an element, and Mr. Fricke's electrical experience served him in good stead.

The brooders are regular

Work Bench in Basement With Electrically Operated Lathe, Saw, etc. Note the Barrel Churn at the End of Bench Which Is Also Electrically Operated.

52 in. galvanized chick oil hovers with the oil burner replaced with the simple electric heating element as shown in the picture elsewhere in this article. These elements are composed of two standard sun-bowl elements and porcelain receptables mounted on a galvanized iron



Upper Left: Living Room, Showing Method of Lighting. Upper Right: Dining Room, Showing Wall Lights. Lower Center: The Fricke Farm Home—a Really Attractive Bungalow-Type House.

dish to fit the opening on the top of the hover. Only one of these elements is required during ordinary weather.

The room heater for the house, assembled by Mr. Fricke, was made at a cost of about $20.00. The heating elements for this heater are two of the standard 1800 watt Hotpoint renewal elements that are used in the large size round open units on the cooking ranges. These long spiral nichrome wires are

Water Heater in Basement.

provided with three brass lugs welded on same, one at each end and one in the middle, by which they are mounted on soapstone slabs.

Mr. Fricke says, "We would hardly know how to get along without electricity on the farm. As we do not buy on the installment plan, some people may imagine that we are having an unusual income to pay for such conveniences as we are adding from time to time. Quite the contrary; our net income from the farm has not as yet equalled what we (three people) might easily, with moderate salaries, be earning in a city. It is due to our reduced cost of living on the farm that enables us to install these comforts even with a smaller income. The electrical appliances enable us to accomplish more and reduce our costs considerably."

Automatic Water System on the Farm

By H. S. ROGERS

Despite the obvious value and convenience of automatic water systems, there are still thousands of rural homes without this equipment. Many people buy conveniences and luxuries and get along with the old pump handle. The automatic water system will do more toward putting the country dwellers in the city convenience class than any other equipment. With it he has his water on tap, both throughout his dwelling and in his barns. It provides the essential means for a modern bathroom and toilets. Besides these present day requirements, it obviously means less work for the farmer's family as water is conveniently on tap instead of having to be pumped and carted from the well. It also provides the barn or outbuildings with water and thus saves the farmer labor and time.

An automatic water system and the convenience which it provides, tends to keep the children from migrating to the city.

Electricity in connection with the automatic water system is the leading factor in bringing the country home up to present day standards.

Electrifying the Farm Work Shop

For All Necessary Chores, Fun and Profit

By WM. L. AYLWARD

THE farmer gets more good out of an electric home work shop than any other individual and there is good reason for this. Every farmer who has electricity has hundreds of uses for power where the city man has but few. It would take columns to enumerate the uses that stand out prominently in a well managed, well organized farm.

It is almost unbelievable the turning jobs that are wide open to the farm shop mechanic. Handles, spokes, ladder rungs, tools and the like can be turned on a lathe so quickly that as fast as the need makes itself known it can be taken care of.

The bench power saw can be used almost every day. Saws of one kind or another are in the hands of farmers continuously year in and year out, building, repairing, etc. All of this hand labor is useless while electricity might just as well be harnessed up to do the same work. Farming is a matter of management, and not of hard labor. Hard labor takes all the fun out of accomplishment, and those who have power tools can accomplish in a fraction of the time work that they could never do quite so well with nothing but a saw and hammer in their hands.

An electric tool, once known and handled by a farmer, will open up countless uses that he had never before dreamed of. A drill with stamina, speed and driving power will prove itself the finest kind of "hired hand."

A Helpful Layout

Add these tools together, put them on an electric bench, and you will be surprised how helpful they will be to every home farm. The best example of practical use that has come to my notice in years was when a farmer wrote us stating that he had just gotten his electric line and that now his oldest ambition was going to be realized. This man, accustomed to tools of all kinds and trained in a small town machine shop, had always kept a hankering for his own private equipment. He bought a home work shop layout of a nationally advertised type and installed a line shaft in the rear end of his buggy shed. He drives this line shaft with a one-half horse power motor

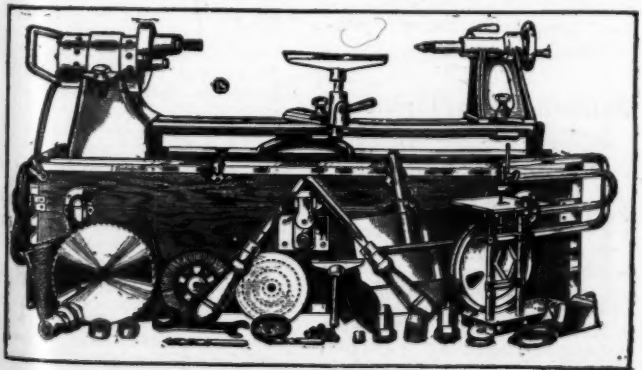


Illustration courtesy, Waco Tool Works.

Here's a Handy Layout —Lathe, Jig-saw, Circular Saw, Grinder, Etc.

and operates simultaneously eight different tools—a lathe, bench saw, jig saw, band saw, drill, emery wheel, scratch brush and rag buffer. In addition to the daily farm requirements of things that have to be made, purchased or repaired, he makes good use of his spare time in keeping every piece of machinery that he owns, from his scythe to his threshing machine, free from rust and in a condition as good as new, year in and year out. He maintains that this has lessened depreciation on the farming equipment to practically nothing outside of wearing parts.

What this man has done to earn dividends on his "shop" is a good example of what every farmer can do with the hours he would otherwise employ in hard labor, without electricity. And only the owner of up-to-date electrified tools can have all the real fun there is in making furniture and toys for the enjoyment of the whole family. It's the joy of craftsmanship, made easy with the help of electricity.

An electric home work shop not only saves time in the actual labor items that come up every hour on the farm, but does this work so quickly and so well that there is no need for the many trips to town which are an annoyance and a waste of time to every ambitious worker. Good equipment makes a good farmer better, and more prosperous!

Modern Developments in Soldering

By P. C. RIPLEY, Research Engineer

THAT solder plays an important role in modern farming cannot be denied. A careful survey of appliances in daily use by the modern agriculturalist discloses the fact that many owe their efficiency to solder. When such apparatus becomes inoperative through the failure of soldered construction, whether caused by accident, injury or wear, repair must be made or the article replaced. Modern developments in soldering appliances and solders have robbed the art of all hit or miss aspects that characterized it for many years.

In the past all who aspired to solder were forced to use the conventional externally heated soldering copper. Adequate means for heating such a tool in the average rural district has always been a deterrent to their employment. Usually the damaged part was neglected or was eventually carried to the tinsmith of a nearby town.

Then came the age of electricity on the farm and science provided the more efficient, electrically heated, soldering iron. By simply plugging into a convenient receptacle and a wait of a few minutes the tool is ready for use. Heat delivery is far more uniform than the conventional copper and, when correct sizes are utilized, display high efficiency at heating.

Uniformity Today

Many uncertainties exist in solders and fluxes. Today, however, alloys of unquestionable purity and fluxes of positive capacity are available in a single unit. This solder tube in wire form, flux filled, correctly proportions the two essentials and with it the novice can accomplish work with the same dispatch as an artisan.

Flux cored wire solder, as the material is called, can be purchased filled either with rosin or acid. The rosin cored solder is for radio and delicate electrical work where a non-corrosive and non-conductive flux is needed. The acid core is an efficient and rapid flux intended for general, all purpose work where speed and strength are paramount.

Any who, in the past, hesitated to use solder because of their fear of failure, can now do so with confidence. Science and progressive development place at their disposal improved appliances and materials of unvarying quality.

Radio Notes

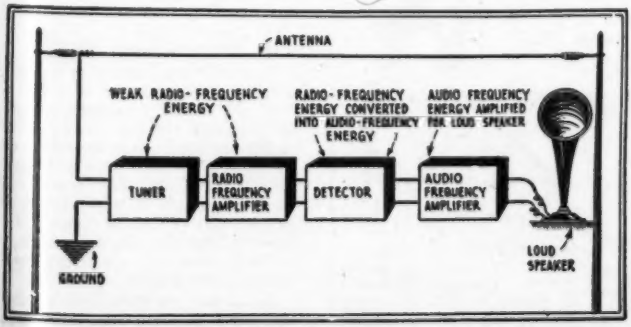
What a Receiver Does

Radio waves, which are all about us these days, cannot be seen, felt or heard. Some means must be employed to intercept and convert them into audible sounds in the form of speech or music. And that is precisely where the radio receiver comes in.

The first step in radio reception is the interception of the radio wave. This is accomplished by means of the antenna or the loop. At the same time, a selection is made of the radio wave which carries the desired program. This is accomplished by adjusting the radio receiver to the same frequency as the desired wave, so that the receiving circuits will respond to that wave. This process is callled *tuning*.

Now the delicate radio energy tuned in must be amplified, inasmuch as it may be too weak to operate the remainder of the receiving apparatus. It so happens that the detector member, which comes next, has a threshhold value which must be exceeded before the detector will rectify the signals. So in order to surmount this threshold value the signals are amplified prior to detection. This is known as radio frequency amplification.

The radio frequency energy, even in greatly amplified form, is still inaudible, even with the most sensitive pair of head-phones. Because of its extreme frequency, of the order of several hundred thousand cycles per second, no telephone mechanism can keep up or respond to its fluctuations. So the next step is to convert the radio frequency energy into audible energy. This is accomplished by the *detector*, and the resultant current is capable of operating a sensitive headphone. However, the signals are still too weak for satisfactory results, and so they are amplified by one or more stages of *audio frequency amplification*. And now, with ample audio frequency energy, we are ready to operate the head-phones or loud-speaker with ample volume.



Elements of the Usual Multi-tube Radio Receiver of the Present Day, Showing the Purpose of Each Element.

Electrical Housekeeping

Cleaning House by Wire

IF our knowledge of history were a little more detailed, doubtless we should find that Eve gave the garden a thorough house cleaning as soon as she moved in.

And she handed the habit on to us.

I formed it early. When I was a very little girl I proudly pried up the tacks in the parlor carpet with the forked end of a slender tack hammer. When I grew older, I swathed my head in towels and shook, and beat, and brushed for hours on end. All the days of my growing up, I viewed the periodic upheavals as a mysterious visitation involved with getting married and having a home of your own.

But I have found that I was wrong.

The Cleaner Supplants the Broom.

A vacuum cleaner properly applied is adequate insurance against any annual necessity for turning the house upside down and inside out.

I would not have you misunderstand me.

I am not claiming that it will wash the windows or do up the parlor curtains. I only mean that it will do the greater part of the job so thoroughly fifty-one weeks of the year that there is no need of doing everything at once in the fifty-second.

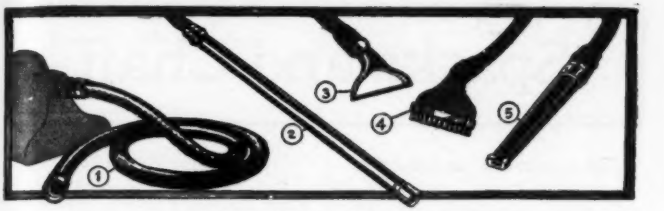
It all depends on how well you know your vacuum cleaner. If you have been thinking that it is made solely for cleaning your rugs, you are missing half of the services it can give you.

The rest of it lies in those attachments you may have left in their long box tucked upon some high shelf out of the way. Perhaps you have been looking at them as extras that it hardly pays to bother with more than once a year or thereabouts. As a matter of fact, they are as intimate a part of the cleaner as the fan or the dust bag.

A Tool for Each Purpose.

The first tool, No. 1, is the hose that fastens to the cleaner itself. You can use it as a suction hose, or you can change your vacuum cleaner into a blower by taking off the dust bag and putting on the hose in its place. No. 2 is a stiff lengthening tube to add to the hose so you can reach the ledges over the windows and doors, the picture molding, and the pictures themselves without climbing on a chair.

No. 3 is a specialized tool. You can use it to clean your mattresses or to draw the dust from upholstered furniture. The No. 4



The Other Half of Your Cleaner.

brush adds to its efficiency if there is much dirt on the surface to carry away. The brush loosens it up so that it can be sucked through the cleaner into the bag.

Most housekeepers feel that curtains seem fresher if they are hung out of doors occasionally between washings, but the washings themselves will not need to be so frequent if No. 3 is used to take the dust out of them now and again. You have to put the lengthening tube in for this job, then you can draw the flat nozzle slowly down the curtain, going over it again and again until it is clean.

I use the soft rubber nozzle on No. 5 to clean around the contents of a drawer, and to reach behind the drawer itself to pick up the dust and bits of fluff that always accumulate. I let it nose around the books on the book shelves for loose dirt, too.

Cleans Piano

One friend of mine uses No. 5 to clean under the wires of her piano. When she first tried it, there was such an accumulation of dust that she could not get it out. She had just bought her cleaner so she promptly called up her dealer and asked him why not.

A salesman came out hurriedly to advise her.

"Have you tried blowing it?" he asked. "Even when the lint is matted down, that will move it."

"No," she answered. "I never thought of that."

So they made a blower of the hose and scattered the dust that way. It had to be picked up again, of course, but it was dislodged from the piano.

Ordinarily No. 2 will take the dust from the coils of a radiator. But if it does not, the blower is equally effective there.

We have registers in our house, and I occasionally lift the top and pick up the dust behind them with No. 5. If it is packed down at all, I loosen it with a whisk broom, and find that it comes up readily enough.

A Convenient Arrangement

One of my neighbors has devised a clever way of making her vacuum cleaner so handy that she never thinks of omitting its use in the daily routine of "redding up." When she had her house rewired last fall, she put a wall connection in a closet off her living room She keeps the cleaner attached there most of the time, with the cord loosely coiled on a large hook near by. There is no more work to running it out to pick up a bit of litter than there is to getting a broom.

"I may use up a vacuum cleaner or two," she says, "but I think my broom is going to last the rest of my life."

Obliging

An old Chinaman who was working in the bush, was aghast to see a big brown bear sniffing at the tracks he had made in the newly fallen snow. "You likee my tlacks?" he gasped. "I makee some more."—Toronto Star.

Sparks and Chaff

Matrimonial Infelicity

Mistress: "So your matrimonial life was very unhappy? What was the trouble — December wedded to May?"

Chloe Johnson: "Lan' sakes, no, ma'am. It was Labor Day wedded to dey day ob rest."

Truth in Advertising

A new 5 and 10 cent store had been opened by a man named Cohen. A woman came in one day and selected a toy for which she handed the proprietor a dime.

"Excuse, lady," said Cohen, "but these toys are 15 cents."

"But I thought this was a 5 and 10 cent store," protested the customer.

"Vell, I leave it to you," came the reply, "how much is it, 5 and 10 cents?"

Quick Finish

"Your daughter recites real well," the professor's wife said to Mrs. Malaprop at the church sociable.

"I'm goin' to give her a course of electrocution." Then smiled and added: "Sort o' finish her off, ye know."

Brave Talk

John: "Are you in favor of clubs for women?"

Jim: "Absolutely, if kindness has no effect."

True Friends

They had been married only a short time when he was required to take a fifty-mile motor trip without her.

Starting in the morning he swore he would return for seven-o'clock dinner. But seven o'clock found him absent. The hours went by and still no husband.

When ten o'clock came the frantic bride sent this telegram to a friend of his in each of five towns through which he would pass:

"John is missing. Much worried. Have you seen anything of him?"

Hubby reached home at midnight, having had engine trouble by the way, and soon the answers began to arrive. Each telegram read:

"John is all right. He is spending the night with me."

Imminent

"I know where the 'lectricity comes from that lights our house," said Alice.

"Where does it come from?" queried her aunt.

"From the wall," replied Alice. "When Ma wants a light she unbuttons it."—*Science and Invention.*

Ole—Tillie, will ye marry me?

Tillie—Yes, Ole.

A long, deadening silence falls. Finally it is broken.

Tillie—Vy don't you say something, Ole?

Ole—I think I say too much already.

MY WARMEST FRIEND

By Mrs. M. E. Nichols

Wise friends are good, they give advice to guide one on his way,
The funny fellow is not bad, he gilds a cloudy day;
The travel chap, too, passes time with yarns like story plots,
Nor should young Croesus be forgot, he shares his car and yachts.
But give to me my true old chum, without a crank or fad,
Just never failing genial warmth—my own electric pad.

Refrigeration Brings New Dairy Profits

(*Continued from page* 12)

ice when we needed it most. Our electric bills aren't near that much. We averaged 148 K. W. hrs. a month from April to December last year."

"Do you put fresh water in the tank often," I asked him.

"No," he smiled. "We are careful to keep the outside of the cans clean. That keeps the water clean too. We drain it off two or three times during the summer. We don't wear out the water much."

Dry Box for Storage

Another of the group, Roscoe Harrington, uses a dry box for his milk storage. It, too, was made by a local carpenter. It is insulated, walls and floor, with the same 3 in. cork used in the tanks. The walls are covered inside and out with matched lumber; but the floor is made of concrete. The brine tank through which the refrigerant circulates is above the storage space. The storage space in the box is 5 ft. by 5½ ft. by 6 ft., —big enough for twelve cans originally but the space allotted to one has been cut out to make a small cabinet refrigerator for household use.

Before the milk is put into this box, it is cooled by running it over a tubular surface cooler.

This is fastened to one end of the storage box. Water circulates through the upper coils to take out most of the heat of the milk. The lower coils are chilled with brine pumped from the tank of the refrigerator.

"I cool the milk down to 37° with this cooler," Mr. Harrington told me. "And if the milk runs a little slow, it may even freeze to the lower coils. The cold room keeps it at 35°.

"Of course it takes more than refrigeration to get that bonus, —and produce grade A milk," he went on. "Everything has to be kept clean all along the line. But when we get the bacteria count down, we can keep it there with one of these outfits."

No one expects cooling milk to make it clean, but these men know that cooling clean milk will keep it so.

Electrical Sterilizer

(*Continued from page* 14)

methods devised to meet this emergency was to place the equipment to be sterilized in a tank or wash tub, fill the container with water and boil it for a certain number of minutes. This system was very inconvenient and required the use of large amounts of fuel.

The next development consisted of adding a separate coal oil or gas burner to the tank and supplying the tank with a lid which was intended to hold the steam in under a very low pressure. Steam became the sterilizing agent instead of boiling water in this unit and the amount of water used was materially reduced. Over the water a tray was placed and upon this tray the equipment to be sterilized rested. Because of the relatively low cost of this unit as compared to a steam boiler outfit and because of its fairly satisfactory performance it has come into general use on the

small and average size dairy farm.

The burner in this unit was placed under the tank and the flame was allowed to play directly on the tank metal. In order to keep the metal from burning out rapidly about fifty pounds of water was used to cover the bottom of the tank. Imperfect combustion caused rapid sooting and the soot became a very effective heat insulator between the flame and the water. In addition the danger of contaminating the milk with coal oil fumes was always present and there was danger of explosion and fire. No heat insulation other than the soot was employed.

Labor Savers

To eliminate these defects in the sterilizers electrically generated heat was suggested. It was necessary to redesign the tank, supply it with adequate heat insulation and materially cut down the amount of water used. The requirements of a successful electrically heated dairy equipment sterilizer, as listed near the beginning of this article, was thus determined and several designs are now manufactured in California. These requirements were determined only after about a hundred laboratory tests had been conducted on various designs and several field tests run. Those who have used these new units are loud in their praise of them. Their chief comment being that they reduce the necessary labor and are clean, convenient and safe. The electrically heated sterilizer can be safely considered past the experimental stage. They are now regular equipment on more than a thousand dairy farms.

What Title for the Cover?

ELECTRICITY ON THE FARM offers a $25.00 cash prize for the best title for the picture shown on the cover of this issue (April).

RULES OF CONTEST

1. Contest closes May 5th.

2. Contestant must be a farmer or a member of his family *living on the farm.*

3. More than one title may be submitted.

4. In case of a tie, each winning contestant will receive $25.00.

5. Print plainly your name and address, and send your suggestion to Title Editor, ELECTRICITY ON THE FARM, 225 West 34th Street, New York, N. Y.

6. The winner for April will be announced in ELECTRICITY ON THE FARM for June.

Motorize Your Silo Filling With a Papec

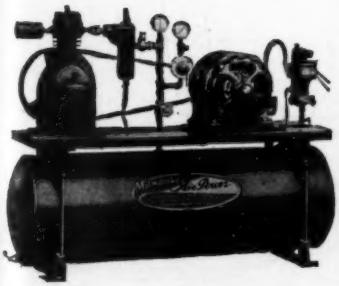
Henry and Walter Franzmeier, near Coates, Minnesota, filled and re-filled their three silos, 14 x 40, 14 x 38 and 16 x 40, with No. 81 Papec and 7½ h.p. electric motor. They used only 340 kilowatt hours for the entire job of nearly 500 tons of silage.

Ask also for literature on Papec Hay Chopping machines or Papec Hammer Type Feed Grinders.

Other letters and data on file. Write for free Papec Catalog, also for special bulletin on "Ensilage Cutters and Single Phase Motors."

PAPEC MACHINE CO. Dept. E
Shortsville, N.Y.

ELECTRIC WATER SYSTEMS



Junior B and C Automatic Electric Plants for shallow and deep wells. Complete with 4-E or 12-E pump.

Capacity 200 to 400 gallons per hour.

Write for complete literature on Suction Plants, Pump Jacks and Pneumatic Water Systems.

MILWAUKEE AIR POWER PUMP CO.
6 Keefe Ave., Milwaukee, Wis.

Here She Is!

Yes sir, none other than Lady Skyline, official world's champion consecutive layer and Colorado's first official 300-egg White Leghorn.

Her official record is: 235 eggs

Lady Skyline

in 235 days; 309 eggs in 360 days.

And word has just been broadcast that the Lady was hatched in a model 6 Petersime electric incubator owned by Goris Brothers, of Canon City, Colo.

Transforming Electricity Into Happiness

Matthew F. Sloan, one of the industrial figures in the city of Brooklyn, N. Y., recently spoke before a convention of life insurance presidents in New York City. What he had to say about the transformation of farm life is quite enlightening.

"Perhaps some of you remember," said Mr. Sloan, "the farm of a generation ago with firewood to cut, water to haul from the well or creek, oil lamps and lanterns to clean and fill, and all the farm labor to be performed by animal and human muscle.

Quite a Difference

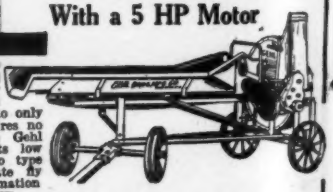
"That's the kind of farm life boys and girls took every desperate opportunity to get away from. It's a far cry from that to a farm with modern electric service—with an electric range, water pumped by electricity, home and barns and outbuildings electrically lighted, electric hay-hoists, milking machines, electric refrigeration for dairy and fruit storage, electric motors for general utility purposes. All that electricity has done for the city home and for the factory it is coming to do for the farm and the farm home.

Progress Assured

"Their problems are being studied scientifically by representatives of power companies, farmers' associations and state colleges of agriculture. As electricity has taken the back-breaking drudgery out of factory work and greatly increased factory production at lowered unit cost, so it is taking the toil—the muscle work—out of farming and reducing the cost of crop production. That is one of the remaining frontiers which electricity is breaking down, and I don't think of any one piece of work ahead of the electric industry which is more important in its social and economic implications. My personal belief is that farm electrification will contribute as much to the farm relief as collective marketing or any scheme of government aid which could possibly be adopted—perhaps a great deal more."

GEHL

SILO FILLER
With a 5 HP Motor



A Combination that has surprised many by its economy and practical features. Fill your own silo when your corn is ready with the help you have on your farm and get the silo full. Power charge amounts to only from $3 to $5 per silo and a motor requires no attendant, saves one man's time. The Gehl Cutter requires less power because of its low speed, is absolutely self-feeding, has auto type gear shift, all gears in oil, boiler plate fly wheel, ball bearings. Write for full information about cutter and running with HP motor.

GEHL BROS. MFG. CO., 449 So. Water, West Bend, Wis.